2. The allowed variation in uniformity under subd. 1. may not be used to exceed the maximum riser height under par. (b) or to decrease the minimum tread depth under par. (c).

(f) Open risers. Stairways with open risers shall be constructed to prevent the through-passage of a sphere with a diameter of 6 inches or larger between any 2 adjacent treads.

(3) HANDRAILS AND GUARDRAILS. (a) General. 1. Stair flights with more than 3 risers shall be provided with at least one handrail for the full length of the stair flight.

2. Handrails or guardrails shall be provided on all open sides of stair flights consisting of more than 3 risers and on all open sides of areas that are elevated more than 24 inches above the floor or exterior grade.

3. Handrails and guardrails shall be constructed to prevent the through passage of a sphere with a diameter of 6 inches or larger.

4. Handrails and guardrails shall be designed and constructed to withstand a 200 pound load applied in any direction.

5. Exterior handrails and guardrails shall be constructed of metal, decay resistant or pressure treated wood, or shall be protected from the weather.

(b) Handrails. 1. Height. Handrails shall be located at least 30 inches, but no more than 38 inches above the nosing of the treads. Measurements shall be taken from the hard structural surface beneath any finish material to the top of the rail. Variations in uniformity are allowed only when a rail contacts a wall or newel post or where a turnout or volute is provided at the bottom steps.

2. Clearance. The clearance between a handrail and the wall surface shall be at least 1 1/2 inches.

3. Winders. a. Except as provided under subd.3. b., the required handrail on winder steps shall be placed on the side where the treads are wider.

b. Where all winder steps in a flight have a tread depth of at least 9 inches from nosing to nosing measured at a point 12 inches from the narrow end of the tread, the required handrail may be located on either side of the stairway.

4. Projection. Handrails and associated trim may project into the required width of stairs and landings a maximum of 4 1/2 inches on each side.

5. Size and configuration. Handrails shall be symmetrical about the vertical centerline to allow for equal wraparound of the thumb and fingers.

a. Handrails with a round or truncated round cross sectional gripping surface shall have a maximum whole diameter of 2 inches.

b. Handrails with a rectangular cross sectional gripping surface shall have a maximum perimeter of 6 1/4 inches with a maximum cross sectional dimension of 2 7/8 inches.

c. Handrails with other cross sections shall have a maximum cross sectional dimension of the gripping surface of 2 7/8 inches with a maximum linear gripping surface measurement of 6 1/4 inches and a minimum linear gripping surface of 4 inches.

Note: See appendix for further information on handrail measurement.

6. Continuity. Handrails shall be continuous for the entire length of the stairs except in any one of the following cases:

a. A handrail may be discontinuous at an intermediate landing.

b. A handrail may have newel posts.

c. A handrail may terminate at an intermediate wall provided the lower end of the upper rail is returned to the wall or provided with a flared end, the horizontal offset between the two rails is no more than 12 inches measured from the center of the rails, and both the upper and lower rails can be reached from the same tread without taking a step.

(c) Guardrails. 1. Application. All openings between floors, and open sides of landings, platforms, balconies or porches that are more than 24 inches above grade or a floor shall be protected with guardrails.

2. Height. Guardrails shall be located at least 36 inches above the floor. Measurement shall be taken from the hard structural surface beneath any finished material to the top of the rail.

3. Opening size. Guardrails shall be constructed to prevent the through-passage of a sphere with a diameter of 6 inches or larger.

*Handrails or Guardrails*

*See handrail digrams in the Appendix.*

***Question***: *At the time of occupancy, a sliding patio door installed in an exterior wall is viewed by the inspector without an exterior deck,landing, stairway or platform. The floor to grade elevation difference is greater then 8 inches. Is this okay since two other exit doors could provide exiting from the dwelling and the elevation difference is less than 24 inches?*

***Answer***: *No. The presence of the door, whether required or not, is installed to allow exiting and movement between areas. There is an elevation difference from the floor to grade in the exit path so a stairway or landing platform is required per s. Comm 21.04 prior to occupancy. However, if the door was substantially fastened closed with hardware and screws that would not allow it to be opened*

*more then 6", then it could be considered glazing and steps would not be required in the interim until a proper exit path is provided.*

***Question:*** *Does a none required guardrail serving a porch less than 24 inches above grade need to comply with the code?*

***Answer:*** *This section does not require the guardrail where the porch is less than 24 inches above exterior grade; therefore the height and other specifications are* ***not*** *required for the guardrail installed. Section Comm 21.04 (Introduction) does require all stairways to conform to the requirements of s. Comm 21.04.*

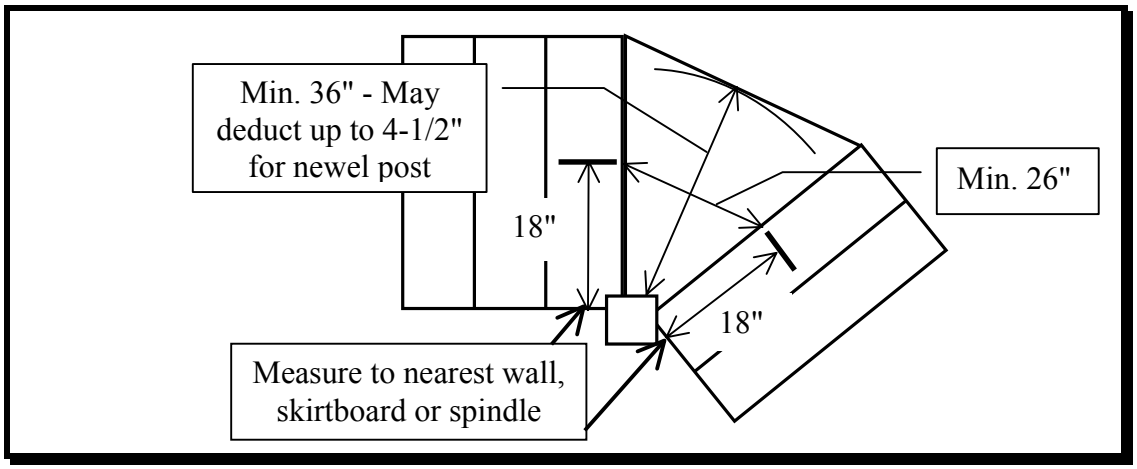
*The designer may still want to install the guardrail per code to alleviate concerns that the installation of a none required guardrail meeting less than the minimum specifications may provide a false sense of safety for the building occupants.*

(4) LANDINGS. (a) Intermediate landings. 1. A level intermediate landing shall be provided for any stairway with a height of 12 feet or more.

2. Intermediate landings that connect 2 or more straight flights of stairs, or 2 flights of stairs at a right angle, shall be at least as wide as the stairs and shall measure at least 36 inches in the direction of travel.

3. Curved or irregular landings shall have a radius of at least 36 inches.

4. Curved or irregular landings shall have a minimum straight line measurement of 26 inches between the nosing of the 2 connecting treads measured at a point 18 inches from the narrow end of the landing measured along the nosing of the 2 treads.




(b) Landings at the top and base of stairs. A level landing shall be provided at the top and base of every stairs. The landing shall be at least as wide as the stairs and shall measure at least 3 feet in the direction of travel.

(c) Doors at landings. 1. Except as provided in subd. 1. a. to c., level landings shall be provided on each side of any door located at the top or base of a stairs, regardless of the direction of swing. In the following exceptions, stairways to attached garages or porches are considered interior stairs:

a. A landing is not required between the door and the top of interior stairs if the door does not swing over the stairs.

b. A landing is not required between the door and the top of an interior stairs of 1 or 2 risers regardless of the direction of swing.

c. A landing is not required between a sliding glass door and the top of an exterior stairway of 3 or fewer risers.

2. The exterior landing, platform or sidewalk at an exterior doorway shall be located a maximum of 8 inches below the interior floor elevation and shall have a length of at least 36 inches in the direction of travel out of the dwelling.

*Projections into Landings*

*The 4 1/2-inch maximum allowed projection of handrails or trim into the width of a stairway on each side also applies to both sides of a landing since the landing is part of the stairway.*

*Interior Sliding Glass Doors*

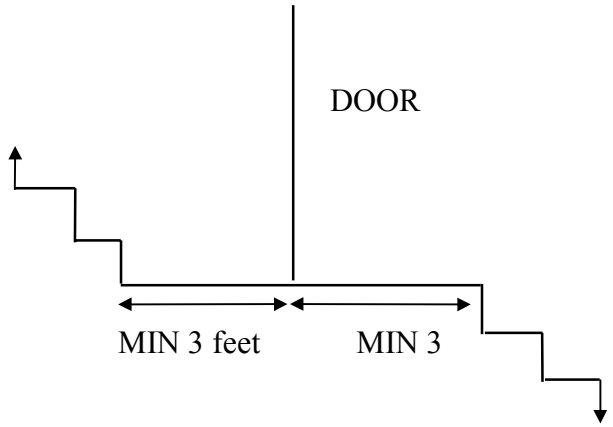
***Question**: Is a landing required at a stairway leading to a sliding door?*

***Answer**: No, if this is an interior door. Exception a., which applies here, eliminates the landing if the door does not swing over the stairs. Obviously, a sliding door could not swing over the steps. This exception applies to both opaque and glazed doors.*

*Yes and no if this is an exterior door. Exception c., eliminates the landing if there are no more than three risers. This exception only applies if the door is a sliding glass door. Otherwise, a landing is always required per the introductory paragraph.*

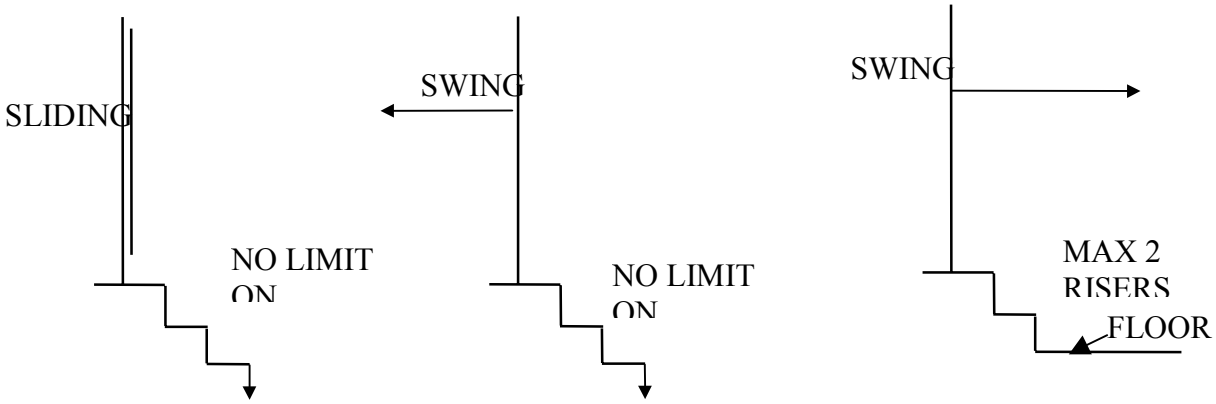
***Question**: Is a landing required at an exterior patio (french door) glazed swinging door?*

***Answer**: If the exterior grade elevation is more than 8 inches lower than the interior floor elevation, a landing is required. The sliding glass door exception does not apply to swing exterior glass doors regardless if they swing in or out of the dwelling.. The argument of the door being glazed permitting occupants to see a elevation change or step conditions on the other side of the door does not hold true due to drapes or other visual obstructions frequently being provided on the door.*

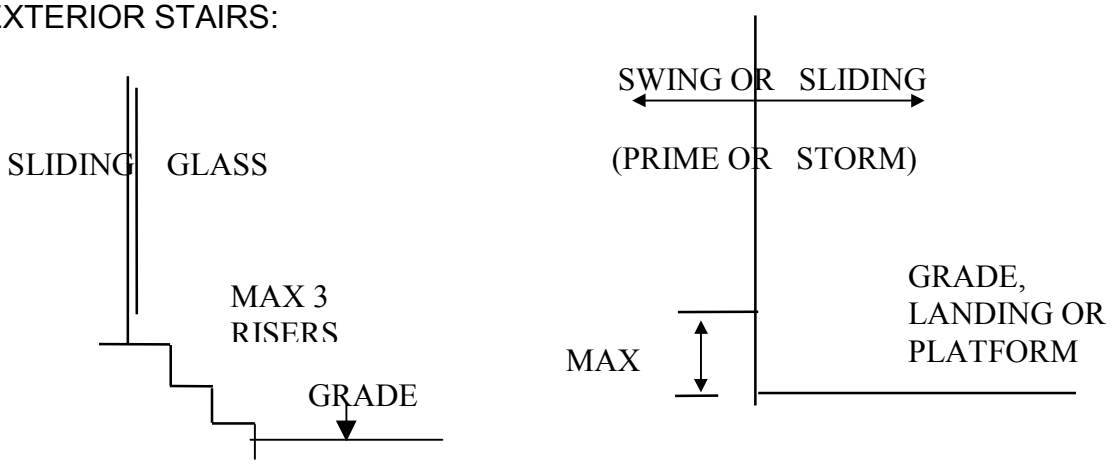



# EXCEPTIONS:

INTERIOR STAIRS: (GARAGES AND (protected) PORCHES ARE INTERIOR SPACES)




EXTERIOR STAIRS:



*Tread and Riser Uniformity*

*Tread and riser uniformity must be maintained in any flight of stairs. Once an intermediate landing occurs, a new flight starts and new riser and tread dimensions may be used.*

***Question**: How is tread and riser measured for the purposes of this requirement, especially taking into account the variety of finish materials used?*

***Answer**: The tread and risers should be measured prior to application of carpeting. Measurements should be taken to hard surface finish materials. This alleviates problems encountered when the homeowner changes carpeting materials. If the carpeting is already in place, the inspector should estimate the thickness of carpeting and padding to determine compliance. The inspector should walk up and down the stairs, as well, to determine what, if any, tripping or falling hazard exists.*

***Question**: At an exterior door (or an interior door, such as the 20-minute rated door, between the house and garage) a threshold separates the main floor level from the stair or landing, either up or down. Is the height of the threshold included in the riser height when you are determining if all risers are uniform?*

***Answer**: No, you always measure from hard surface to hard surface. This means from the floor level to the landing or tread, even if the threshold **"could"** be stepped on, it **is not** included in the height of the riser. Remember that carpeting is not a hard surface even if is indoor/outdoor type material.*

**Comm 21.042 Ladders.**

Ladders which are used as part of a required exit shall conform to this section.

(1) DESIGN LOAD. Ladders shall be designed to withstand loads of at least 200 pounds.

(2) Tread or rungs. (a) Minimum tread requirements shall be specified in Table 21.042. Treads less than 9 inches in width shall have open risers. All treads shall be uniform in dimension.

TABLE 21.042

| Pitch of Ladder Angle to Horizontal (degrees) | Maximum Rise (inches) | Minimum Tread (inches) |
|---|---|---|
| 41.6 to 48.4 | 8 | 9 |
| greater than 48.4 to 55.0 | 9 | 8 |
| greater than 55.0 to 61.4 | 10 | 7 |
| greater than 61.4 to 67.4 | 11 | 6 |
| greater than 67.4 to 71.6 | 12 | 5 |
| greater than 71.6 to 75.9 | 12 | 4 |
| greater than 75.9 to 80.5 | 12 | 3 |
| greater than 80.5 to 90 | 12 | 2 |

(b) Rungs may only be used for ladders with a pitch range of 75° to 90°. Rungs shall be at least 1 inch in diameter for metal ladders and 1 1/2 inches for wood ladders. All rungs shall be uniform in dimension.

*Ladder Treads*

*Ladder treads are measured the same as stairway treads - horizontally from nosing to nosing.*

(3) RISERS. Risers shall be uniform in height and shall conform with Table 21.042.

(4) WIDTH. The width of the ladder shall be a minimum of 20 inches wide and a maximum of 30 inches wide.

(5) HANDRAILS. (a) Handrails shall be required for ladders with pitches less than 65°.

(b) Handrails shall be located at least 30 inches, but not more than 38 inches, above the nosing of the treads.

(c) Open handrails shall be provided with intermediate rails or an ornamental pattern such that a sphere with a diameter or 6 inches or larger cannot pass through.

(d) The clearance between the handrail and the wall surface shall be at least 1 1/2 inches.

(e) Handrails shall be designed and constructed to withstand a 200-pound load applied in any direction.

(6) CLEARANCES. (a) The ladder shall have a minimum clearance of at least 15 inches on either side of the center of the tread.

(b) The edge of the tread nearest to the wall behind the ladder shall be separated from the wall by at least 7 inches.

*Top Ladder Tread*

*This code section is requiring that the top tread's (first tread below the floor level) back edge be at least 7 inches from the wall in front of it. This ensures adequate footroom and still allows a full depth tread.*

(c) A passage way clearance of at least 30 inches parallel to the slope of a 90° ladder shall be provided. A passage way clearance of at least 36 inches parallel to the slope of a 75° ladder shall be provided. Clearances for intermediate pitches shall vary between these 2 limits in proportion to the slope.

(d) For ladders with less than a 75° pitch, the vertical clearance above any tread or rung to an overhead obstruction shall be at least 6 feet 4 inches measured from the leading edge of the tread or rung.

**Comm 21.045 Ramps.**

Every exterior or interior ramp which leads to or from a required exit shall comply with the requirements of this section.

(1) SLOPE. Ramps shall not have a gradient greater than 1 in 8 or one foot of rise in 8 feet of run. Walkways with gradients less than 1 in 20 or one foot of rise in 20 feet of run are not considered to be ramps.

(2) SURFACE AND WIDTH. Ramps shall have a slip resistant surface and shall have a minimum width of 36 inches measured between handrails.

(3) HANDRAILS. Handrails shall be provided on all open sides of ramps. Every ramp that overcomes a change in elevation of more than 8 inches shall be provided with at least one handrail.

(a) Ramps which have a gradient greater than 8.33% or 1:12 or one foot rise in 12 feet of run and which overcome a change in elevation of more than 24 inches shall be provided with handrails on both sides.

(b) Handrails shall be mounted so that the top of the handrail is located between 30 to 34 inches above the ramp surface.

(c) Open-sided ramps shall have the area below the handrail protected by intermediate rails or an ornamental pattern to prevent the passage of a sphere with a diameter of 6 inches or larger.

(d) The clear space between the handrail and any adjoining wall shall be at least 1-1/2 inches.

(4) LANDINGS. A level landing shall be provided at the top, at the foot and at any change in direction of the ramp. The landing shall be at least as wide as the ramp and shall measure at least 3 feet in the direction of travel.

**Comm 21.05 Light and ventilation.**

(1) NATURAL LIGHT. All habitable rooms shall be provided with natural light by means of glazed openings. The area of the glazed openings shall be at least 8% of the net floor area, except under the following circumstances:

(a) Exception. Habitable rooms, other than bedrooms, located in basements or ground floors do not require natural light.

(b) Exception. Natural light may be obtained from adjoining areas through glazed openings, louvers or other approved methods. Door openings into adjoining areas may not be used to satisfy this requirement.

(2) VENTILATION. (a) Natural ventilation. Natural ventilation shall be provided to all habitable rooms by means of openable doors, skylights or windows. The net area of the openable doors, skylights or windows shall be at least 3.5% of the net floor area of the room. Balanced mechanical ventilation may be provided in lieu of openable exterior doors, skylights or windows provided the system is capable of providing at least one air change per hour of fresh outside air while the room is occupied. Infiltration may not be considered as make-up air for balancing purposes.

(b) Exhaust ventilation. All exhaust ventilation shall terminate outside the building.

*Light and Ventilation*

***Question***: *Can an exhaust vent duct terminate in the attic, crawlspace, garage or into the roof soffit.*

***Answer***: *No. This code section requires that all exhaust duct shall terminate OUTSIDE the "building" or "structure." Therefore, the exhaust system may not terminate in the attic, crawlspace, garage or within the soffit portion of the attic. The soffit material on either side of the exhaust discharge grill should be solid for at least 2' on either side of the grill so that exhaust is not directed back into the attic space. However, exhaust ducts are not prevented from passing through these areas as long as the duct termination passes through or is tight fitted to the exterior "skin" of the building to ensure the air is exhausted outside. Simply pointing an exhaust duct in the direction of a soffit vent or other vent opening is not acceptable. This issue is similarly regulated by s. Comm 23.02(3)*

(3) ATTIC VENTILATION. Ventilation above the ceiling or attic insulation shall be provided as specified in s. Comm 22.08 (1).

(4) CRAWLSPACE VENTILATION. (a) General. Unheated crawlspaces shall be ventilated in accordance with either s. Comm 22.08 (2).

(b) Vapor retarder. 1. Crawlspaces shall be provided with a vapor retarder that has a transmission rate of 0.1 perm or less.

2. All decayable organic material, including topsoil, shall be removed from crawlspace floors prior to placing the vapor retarder.

*Attic and Crawlspace Ventilation*

*Also see s. Comm 22.08 of the code and this commentary for additional requirements and information.*

(5) SAFETY GLASS. Except as provided in par. (e), glazing shall consist of safety glass meeting the requirements of ANSI Z 97.1 when installed in any of the following locations:

(a) In any sidelight adjacent to a door where the nearest point is within 2 feet of the door.

(b) In a wall that comprises part of a tub or shower enclosure where the glazing is within 5 feet vertically of the lowest drain inlet and within 3 feet horizontally of the nearest part of the inner rim of the tub.

(c) Within 4 feet vertically of a tread or landing in a stairway and within one foot horizontally of the near edge of the tread or landing.

(d) Within 4 feet vertically of the floor and 3 feet horizontally of the nosing of the top or bottom tread of a stair.

(e) Safety glass is not required where the size of an individual pane of glass is 8 inches or less in the least dimension.

Note: The U.S. Consumer Product Safety Commission requires safety glass for glazing in internal and external doors, including storm door and patio doors, as well as for the tub or shower enclosures themselves. These federal rules, contained in 16 CFR, subchapter B, part 1201, apply in addition to any state rules or statutes.

*Safety Glass*

*This code section is very brief and needs some elaboration. It is important to note that state statutes s. 101.125 also requires safety glazing. In addition, the Federal Consumer Product Safety Commission (CPSC) in its regulation 16 CFR Part 1201 sets a minimum for safety glazing requirements that states may only exceed with their requirements. While local inspectors are not responsible for enforcing state statutory or CPSC's requirements, we are including them to clarify the UDC requirements and to inform contractors of their total obligations. Also, while most of the items covered by these requirements are glazed in the factory, local inspectors may become involved when site-made doors are used, re-glazing is done, old doors are reused, sidelights are site-installed or when the manufacturer fails in its obligations. Following are some questions and answers on these various requirements.*

***Question**: Why is safety glazing necessary?*
***Answer**: The CPSC found that prior to its rules in 1974 that approximately 73,000 injuries related to architectural glazing were treated annually in hospitals nationwide. Almost half were under age 14. The worst accidents are those where the victim breaks the glass on impact and then he or she rebounds back. On the rebound, the shards of glass get caught under the skin and then severely rip it as the victim continues rebounding.*

***Question***: *What is and isn't acceptable as safety glazing?*

***Answer***: *Acceptable:*

- *<u>Tempered glass</u> is acceptable. It is produced by reheating glass and then suddenly cooling it. It is four times stronger than regular annealed glass. It cannot be cut after tempering so dealers will often need to custom order it from a tempering facility. It breaks into small pieces when broken.*

- *<u>Laminated glass</u> is acceptable. It consists of two or more layers of glass bonded to a tough resin interlayer. It can be cut or drilled.*

*Tempered glass and laminated glass is classified by the manufacturer as either Category I for use only in doors where the glazing is less than 9 square feet or Category II for all other uses.*

*Not Acceptable:*

- *Wired glass is not acceptable by the CPSC except when used in a code-required fire separation as in s. 21.08 of this commentary. However, the State Statutes would allow it anywhere.*

- *Heat-strengthened glass is not acceptable. It is produced similarly to tempered glass but is cooled slower. As a result, it is only twice as strong as regular annealed glass. It can be cut or drilled.*

- *Annealed glass is not acceptable. It is regular glass that may also be known as flat or primary glass. Also not acceptable are plate, float, sheet and patterned glass. These are easily cut and drilled.*

*<u>Plastic glazing</u> is not considered glass so it is not subject to the safety glazing requirements.*

*When safety glazing is required, all layers of a multi-layer assembly (e.g., insulated glass) must be safety glazed.*

***Question***: *Is safety glazing required in glazed panels on both sides of a sliding patio door which has one fixed and one operating panel?*

***Answer***: *Yes, the CPSC requires both panels of a patio door to be safety glazed, whether they are fixed or operating. Therefore the Wisconsin code requirement applies to glazed panels on either side.*

***Question***: *Are these requirements retroactive?*

***Answer***: *While the UDC only applies to one- and two-family dwellings built since June 1, 1980, both the CPSC and state statutory requirements are retroactive to any reglazing work done in all types and ages of structures.*

***Question***: *How can I identify safety glass?*
***Answer***: *It will normally have a permanent label in the corner.*

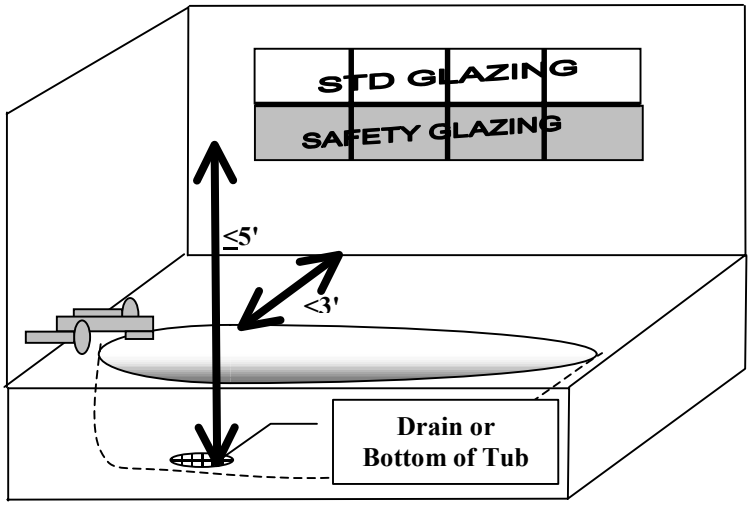
***Question***: *Can leaded stained glass be used where safety glass is required?*
***Answer***: *Yes, based on the state statutes and CPSC regulations, this would be acceptable.*

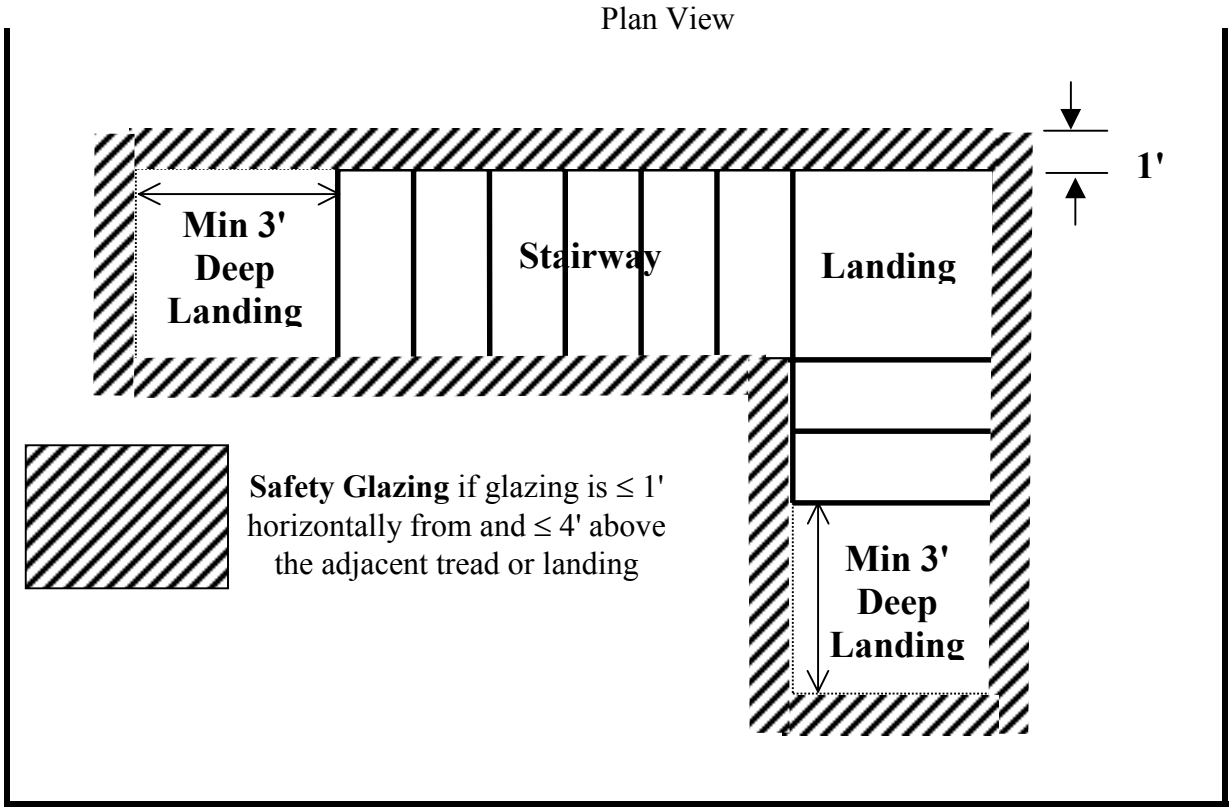
***Question***: *Does the UDC require safety glass in panels or windows that come down near the floor but not next to a door?*
***Answer***: *No, although the Commercial Building Code, various model codes and good design would require safety glass in such situations, the UDC does not.*

***Question***: *Is safety glass required in garage vehicle doors?*
***Answer***: *No. The safety glazing requirement is for doors that are primarily used for human passage.*

***Question***: *Is safety glass required in skylights?*
***Answer***: *Not by the UDC or CPSC, although the Commercial Building Code and various model codes require its use in skylights. However, the 20 or 40 PSF snow load requirement of the UDC must be met. Similarly, the 200-pound loading requirement must be met for guardrails and handrails with glass infill sections.*

***Question***: *Are glass blocks or glass block windows used in a tub or shower area in compliance with the safety glazing rules?*
***Answer***: *Yes, first the individual units normally don't exceed the minimum dimensional requirements for safety glazed units. Secondly, the process used in the manufacturing of glass block puts them into the category of a masonry unit and therefore they do not need to meet the requirements for safety glazing.*






**Comm 21.06 Ceiling height.**

All habitable rooms, kitchens, hallways, bathrooms and corridors shall have a ceiling height of at least 7 feet. Habitable rooms may have ceiling heights of less than 7 feet provided at least 50% of the room's floor area has a ceiling height of at least 7 feet. Beams and girders or other projections shall not project more than 8 inches below the required ceiling height.

*Ceiling Height*

***Question***: *Does a basement have to comply with the 7-foot minimum ceiling height requirement?*

***Answer***: *It only does in those 'habitable' areas of the basement that contain rooms used for sleeping, living, dining, kitchens, hallways, bathrooms and corridors. From a practical standpoint, most basements will contain some of these uses initially or after the basement is finished-off in the future. Some foresight by the builder/owner is required, since changing ceiling height is not a practical building alteration.*

***Question***: *May a ceiling fan or light fixture encroach on the required ceiling height?*

***Answer***: *A ceiling fan or light fixture may encroach similar to a beam or ductwork - no more than 8 inches below the required ceiling height; therefore, 6'-4" minimum clearance maintained between fan or other obstruction and the floor.*

**Comm 21.07 Attic and crawlspace access.**

(1) ATTIC. Attics with 150 or more square feet of area and 30 or more inches of clear height between the top of the ceiling framing and the bottom of the rafter or top truss chord framing shall be provided with an access opening of at least 14 by 24 inches, accessible from inside the structure.

***Question***: *Can access be provided from outside the building such as an outside vent or scuttle?*

***Answer***: *Yes, however, any area of 150 square feet or more must still comply with the minimum opening size of 14" x 24". This means if you have a home with more than one attic space separated by a cathedral ceiling, two openings would be needed.*

(2) CRAWLSPACES. Crawlspaces with 18 inches of clearance or more between the crawlspace floor and the underside of the house floor joist framing shall be provided with an access opening of at least 14 by 24 inches.

***Question***: *Do crawlspaces built with less than 18 inches of clearance or over concrete slabs need access?*

***Answer***: *No access required; however, if area is outside the dwelling thermal envelope, venting is required.*

Note: Access to plumbing or electrical systems may be required under chs. Comm 81-86, Plumbing Code or ch. Comm 16, Electrical Code, Volume 2.

*Definition of Crawlspace*

*The requirements of crawlspace ventilation and floor covering per ss. Comm 21.05(4) and 22.08(2) and 22.22(5) would apply to all under-floor spaces outside the thermal envelope.*

**Comm 21.08 Fire separation and dwelling unit separation.**

(1) FIRE SEPARATION. Dwelling units shall be separated from garage spaces, accessory buildings and other dwelling units in accordance with Table 21.08 and the following requirements:

TABLE 21.08

| Between Dwelling And: | Distance Between Objects[1] | Fire-Rated Construction[2, 5] |
|---|---|---|
| Detached garage or accessory building on same property | Less than 5 feet | 3/4-hour wall[3]<br>1/3-hour door or window[3] |
| Another dwelling on same property | Less than 5 feet | 3/4-hour wall[4]<br>1/3-hour door or window[4] |

| | | |
|---|---|---|
| Detached garage, accessory building, or other dwelling on same property | 5 to 10 feet | ¾-hour wall[3]<br>No requirement on openings |
| Detached garage, accessory building, or other dwelling on same property | More than 10 feet | No requirements |
| Property Lines | Less than 3 feet | ¾-hour wall<br>1/3-hour door or window |
| Property Lines | 3 feet or more | No requirements |

[1]Distance shall be measured perpendicular from wall to wall or property line, ignoring overhangs.
[2]Fire rated construction shall protect the dwelling from an exterior fire source.
[3]Fire rated construction may be in either facing wall.
[4]Fire rated construction shall be in both facing walls.
[5]The methods for garage separation in par. (a) 1. are examples of ¾-hour wall construction.

(a) Attached garages. 1. The walls and ceiling between an attached garage and any portion of the dwelling, including attic or soffit areas, shall be ¾ hour fire-resistive construction or shall be constructed as specified in any of the following:

a. One layer of 5/8-inch Type X gypsum drywall shall be used on the garage side of the separation wall or ceiling.

b. One layer of ½-inch gypsum drywall shall be used on each side of the separation wall or ceiling.

c. Two layers of ½-inch gypsum drywall shall be used on the garage side of the separation wall or ceiling.

2. For all methods listed under subd. 1., drywall joints shall comply with one of the following:

a. Joints shall be taped or sealed.

b. Joints shall be fitted so that the gap is no more than 1/20-inch with joints backed by either solid wood or another layer of drywall such that the joints are staggered.

Note: 1/20-inch is approximately the thickness of a U.S. dime.

3. Vertical separations between an attached garage and a dwelling shall extend from the top of a concrete or masonry foundation to the underside of the roof sheathing or fire-resistive ceiling construction.

4. Adjoining garage units are not required to be separated from each other.

(b) Structural elements exposed in an attached garage. Beams, columns and bearing walls which are exposed to the garage and which provide support for habitable portions of the dwelling shall be protected by one of the methods specified in par. (a) 1. a. or c. or other ¾ hour fire-resistive protection.

(c) Doors. The door and frame assembly between the dwelling unit and an attached garage shall be labeled by an independent testing agency as having a minimum fire-resistive rating of 20 minutes. The test to determine the 20-minute rating is not required to include the hose stream portion of the test.

**Note:** Acceptable tests for fire rating of door assemblies include ASTM E-152, UL 10B, and NFPA 252.

(d) Other openings. 1. Access openings in fire separation walls or ceilings shall maintain the required separation and shall have any drywall edges protected from physical damage.

2. The cover or door of the access opening shall be permanently installed with hardware that will maintain it in the closed position when not in use.

*Fire Separation*

***Question***: *It has been common practice to have a 6- to 8-inch step between a garage and the house. Is this no longer a requirement in the Uniform Dwelling Code?*

***Answer***: *The step requirement has **never** been a rule in the Uniform Dwelling Code. That requirement appears to be one that had been established in local ordinances. We are unable to find any national building code which has any requirement relating to a difference in elevation between a garage floor and the interior of the dwelling. Builders who are concerned with handicap accessibility are promoting same height floor levels.*

*The Uniform Dwelling Code, however, does provide safety for the occupants of a dwelling with an attached garage in a number of alternate ways. The main requirement is that of a 45-minute fire separation as outlined in s. Comm 21.08. The dwelling code also requires, under s. Comm 21.08(2), that the floor of the garage slope toward the exterior. These two requirements, along with the requirement of s. Comm 21.09 requiring smoke detectors, are deemed to provide adequate protection for the occupants.*

***Question***: *Is it acceptable for an attic access opening to be located in the fire separation wall or ceiling?*

***Answer***: *Yes, if the opening cover or door is constructed such that:*

- *The 45-minute rating is maintained.*

- *Any dry wall edges on both the hatch and the surrounding area exposed to physical damage are protected.*
- *The cover or door is installed so that it is permanent (none removable) with hardware to maintain it in a closed position with latching hardware to maintain it in a closed position. This could be accomplished by the use of spring loaded hinges, door closer, or hardware that will not allow it to be left in an open position when not in use. A single bolt type or hook and eye hardware does not provide a positive closure since these could allow the door to be left open. Likewise drywall screws are "fasteners" and not hardware so they can not be used as the only means of keeping access doors closed. Vertical or horizontal sliding doors must also have hardware installed that will maintain them in a closed position when not in use.*

(2) DWELLING UNIT SEPARATION. (a) General. In 2-family dwellings, dwelling units shall be separated from each other, from common use areas, from shared attics, and from exit access corridors.

(b) Doors. Any door installed in the dwelling unit separation shall have the door and frame assembly labeled by an independent testing agency as having a minimum fire-resistive rating of 20 minutes. The test to determine the 20-minute rating is not required to include the hose stream portion of the test.

(c) Walls. Walls in the dwelling unit separation shall be protected by not less than one layer of ½-inch gypsum wallboard or equivalent on each side of the wall with joints in compliance with sub. (1) (a) 2.

(d) Floors and ceilings. A fire protective membrane of one layer of 5/8-inch Type X gypsum wallboard with joints in compliance with sub. (1) (a) 2., shall be provided on the ceiling beneath the floor construction that provides the separation.

(e) Attics and concealed roof spaces. 1. Attic areas, mansards, overhangs and other concealed roof spaces shall be totally separated above and in line with the tenant separation wall.

2. Acceptable attic separation materials include:

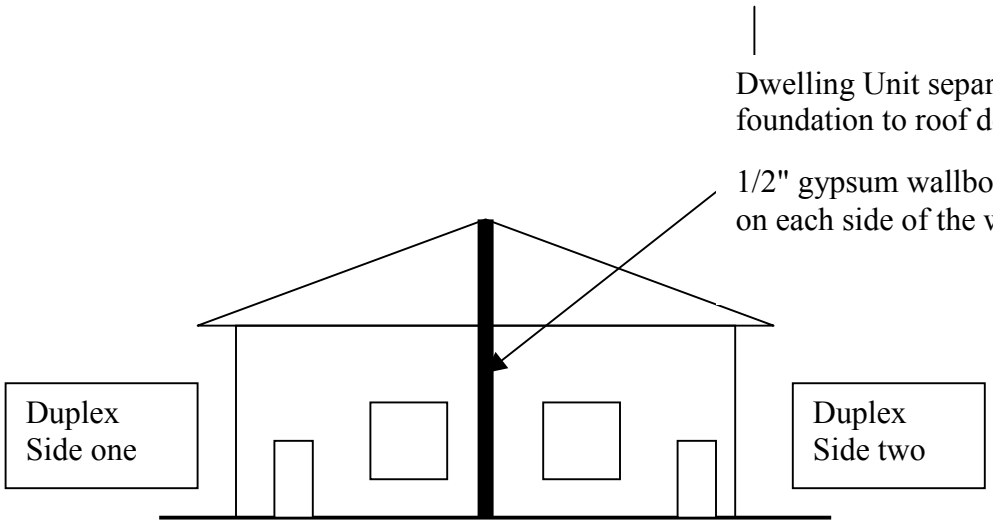
a. 2-inch nominal lumber.

b. Two layers of one-inch nominal lumber.

c. 1/2-inch nominal plywood or wood structural panel.

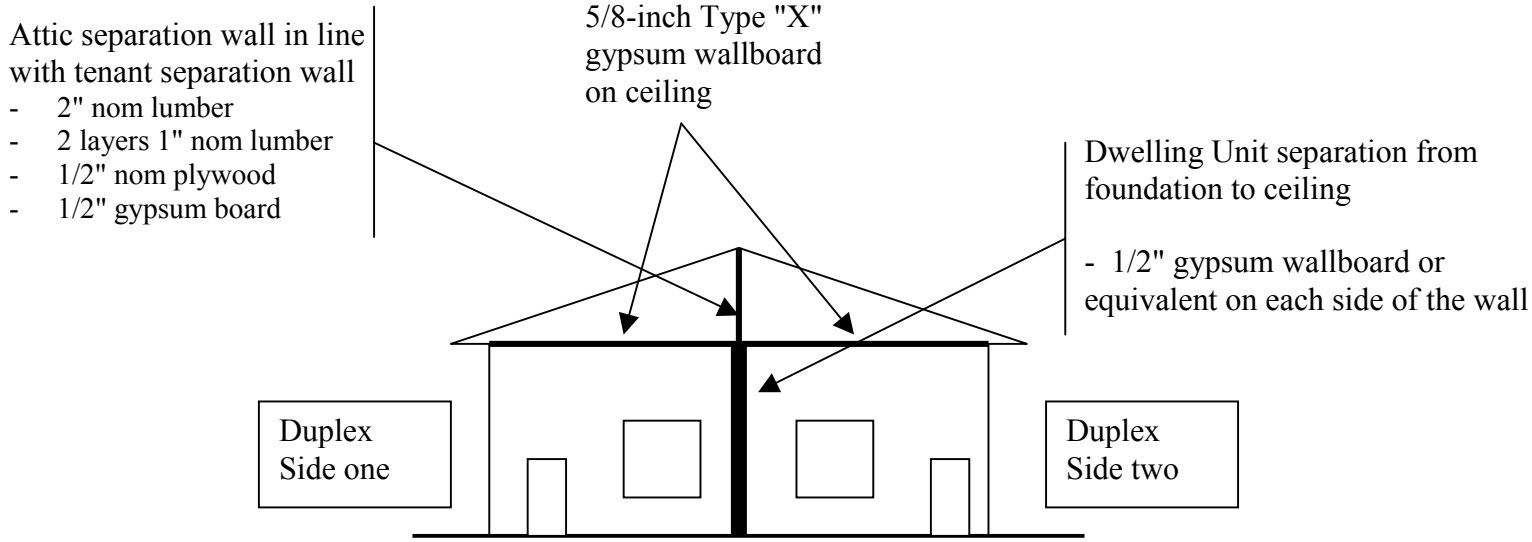
d. 1/2-inch gypsum board.

e. Fiberglass or mineral wool batt insulation may be used in an unsupported condition provided the least dimension of the opening does not exceed 4 inches.




**METHOD #1**
**Comm 21.08 (2) (a) & (c)**

NOTE: Duplexes that have access to the attic from both dwelling units are considered shared attics and shall be separated per Method #1.




**METHOD #2**
**Comm 21.08 (2) (a), (c), (d) & (e).**

(3) PENETRATIONS. (a) Ducts. 1. Except as allowed under subd. 2., all heating and ventilating ducts that penetrate a required separation shall be protected with a listed fire damper with a rating of at least 90 minutes.

2. The fire damper required under subd. 1. may be omitted in any of the following cases:

a. There is a minimum of 6 feet of continuous steel ductwork on at least one side of the penetration.

b. The duct has a maximum cross-sectional area of 20 square inches.

(b) Electrical and plumbing components. Penetrations of a required separation by electrical and plumbing components shall be firmly packed with noncombustible material or shall be protected with a listed through-penetration firestop system with a rating of at least one hour.

***Question***: *How do you measure the distances indicated in Table 21.08 regarding dwellings and attached/detached garages and accessory buildings?*

***Answer***: *Fire-rated construction may only be required in situations of a common house/garage wall or of adjoining house and garage walls that are less than 10 feet apart when measured perpendicularly from the house walls. Per Table 21.08, fire-rated construction would not be required if the distance between walls is 10 feet or more. The fire-rated construction is required only in those portions of either wall that does not meet the above test. In attached connecting breezeways or porches where there is no common wall but a common roof, the entire fire wall separation is required. This follows from the requirement that any fire separation shall extend from the top of the concrete or masonry foundation to the underside of the roof sheathing or ceiling. (See diagrams.)*

FIG. A

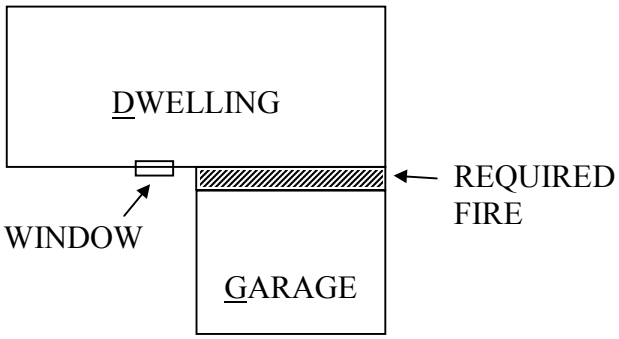



FIG. B

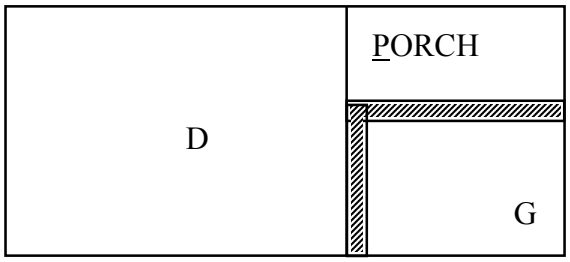


FIG. C

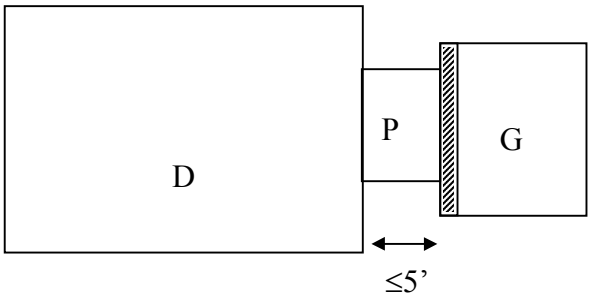



FIG. D

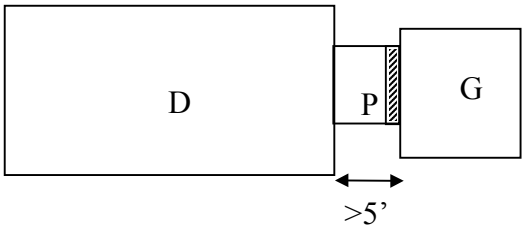



FIG. E

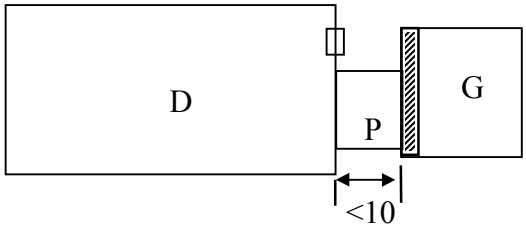



FIG. F

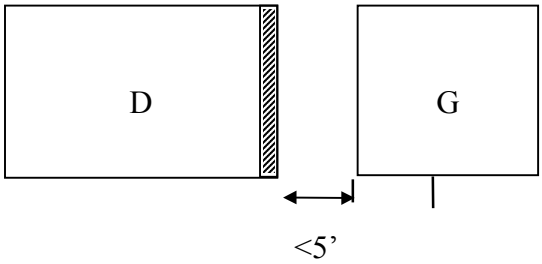



FIG. G

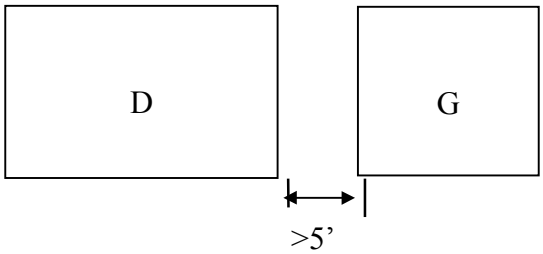



FIG. H

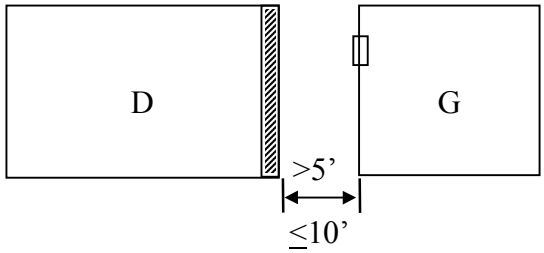
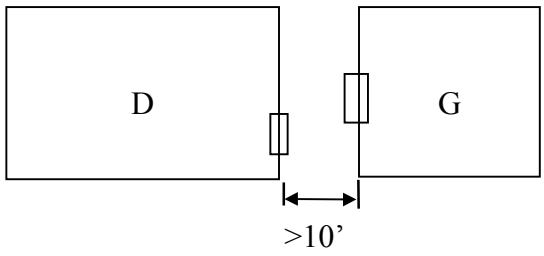


FIG. I




**Comm 21.085 Fireblocking.** (1) FIREBLOCKING LOCATIONS. Fireblocking shall be provided in all of the following locations:

(a) In concealed spaces of walls and partitions, including furred spaces, at the ceiling and floor levels.

(b) At all interconnections between concealed vertical and horizontal spaces including the attachment between a carport and a dwelling.

(c) In concealed spaces between stair stringers at the top and bottom of the run and at any intervening floor level.

(d) At all openings around wires, cables, vents, pipes, ducts, chimneys and fireplaces at ceiling and floor level.

(2) FIREBLOCKING MATERIALS. Fireblocking shall consist of one of the following:

(a) 2-inch nominal lumber.

(b) Two layers of one-inch nominal lumber.

(c) One thickness of 3/4-inch nominal plywood or wood structural panel with any joints backed with the same material.

(d) One thickness of 1/2-inch gypsum wallboard, face nailed or face screwed to solid wood, with any joints backed with the same material.

(e) Fiberglass or mineral wool batt insulation may be used if both of the following conditions are met:

1. The least dimension of the opening may not exceed 4 inches.

2. The batt shall be installed to fill the entire thickness of the opening or stud cavity.

(f) For wires, cables, pipes and vents only, non-shrinking caulk, putty, mortar, or similar material may be used provided no dimension of the opening exceeds 1/2 inch around the penetrating object.

(g) For chimneys, fireplaces and metal vents, fireblocking shall be metal, cement board or other noncombustible material.

***Question***: *How should tub/shower units be fireblocked?*
***Answer***: *For most units, there should be no need for fireblocking since interconnected vertical concealed spaces do not require fireblocking. However, if the unit had a canopy with a dropped soffit, then the fireblocking requirements would apply to the interconnected vertical and horizontal concealed spaces, similar to kitchen cabinet soffits. Also, the floor below a tub should be fireblocking fireblocking if it allows air/fire passage between levels within concealed spaces.*

*Typical Fireblocking - Draftstopping Details*

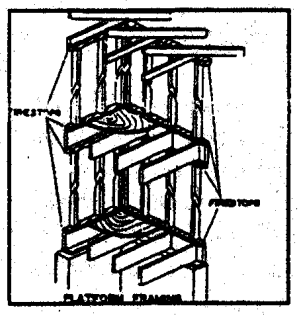
*Fireblocking shall be provided in wood frame construction in the following locations:*

*In concealed spaces of stud walls and partitions, including furred spaces, at the ceiling and floor levels.*

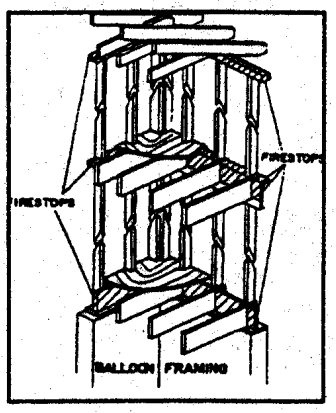
*Fiberglass Insulation*

***Question***: *Is fiberglass insulation acceptable as a fireblocking and draftstopping material?*
***Answer***: *Yes. This section allows other noncombustible materials in lieu of the traditional 2-inch nominal wood or drywall firestops. Unfaced fiberglass batt insulation has passed the E-136 (ASTM) test for noncombustibility. Therefore, such insulation will be allowed if it is tightly packed with materials which will be held in place and at least one dimension, length or width, of the gap to be filled is 4 inches or less, as limited by the combustibility test. Depth of the gap is not limited. These dimensions refer to the gap encountered in the direction of the fire travel as addressed by s. Comm 21.08. If a greater dimension occurs, then mechanical anchorage, such as chicken wire on both faces, shall be used.*

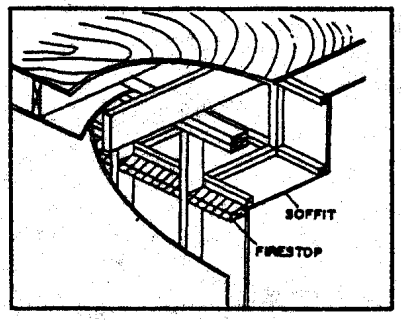
At ceiling and floor levels in platform framing. The material used for this application is framing lumber.



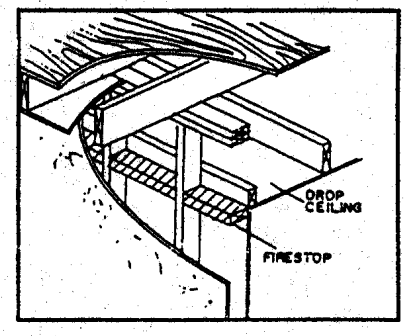
When remodeling an old house, beware of balloon framing. This framing technique is a fire hazard and must have firestops applied. The material used here is framing lumber. Balloon framed homes with cellulose insulation blown into the walls are much more firesafe than those with open cavities or more air permeable insulations.



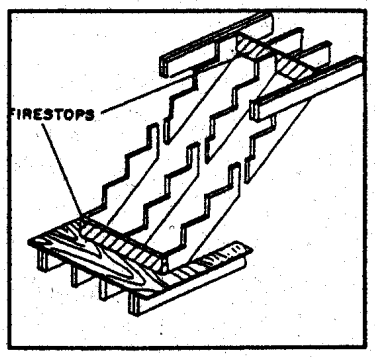

Firestopping at the soffit is critical to preventing a fire from rapidly moving into the open attic area. Material used is to be framing lumber.

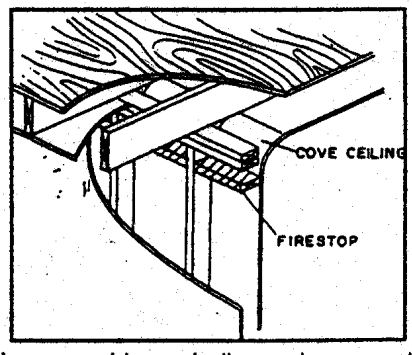



Firestopping needs to be installed below the dropped ceiling to prevent rapid movement into a large, open area. Material used is to be framing lumber.




The two firestops applied to stair stringers are critical to the firestopping system and prevent the fire from moving quickly to the area between the floors. Material is to be boards, cement board, or plywood.




Cove ceilings provide a challenge because there is insufficient wood to stop the fire against the curvature of the ceiling. Firestops must be applied against the verticle portion of the wall. Material used is to be framing lumber.